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REPORT BY CONSULTING BOTANIST ON A SERIOUS DISEASE IN THE CHERRY ORCHARDS OF KENT.

[*Ordered by the Council to be printed and circulated, February* 6, 1901.]

A LEAF disease of cherries has lately been reported from several orchards in the county of Kent. In the early summer it affects the leaves and fruit simultaneously, rendering the latter unfit for market. In autumn and winter its presence is easily detected. The diseased leaves remain attached to the branches as if the tree had been killed in the full vigour of growth, just as the withered leaves remain on a branch that has been severed from the stem.

The fall of the leaf in autumn is a normal process carried out by the living leaf, which forms at the point of its attachment to the branch a cicatrix that secures when completed the easy severance of the leaf from the branch, leaving a clean scar. The speedy and fatal injury to the leaf caused by the fungus prevents the formation of this cicatrix, and the leaf remains attached to the tree.

A further striking characteristic of this disease is the shortening of the branches which bear the diseased leaves. The internodes or joints between the leaves of these branches have not been developed. The year's growth, which should have extended to a considerable length, measures less than an inch. The crowded leaf-bases have each a healthy bud in the axil. The dwarfing of the branch is not due to any attack from a fungus, for no fungus is present in the tissues. The dwarfing is entirely due to the want of food, consequent on the early death of the leaf. That this is the case is confirmed by the fact that some of the dwarfed branches have produced in the following year vigorous normal shoots.

The leaves were not received until late in the year, when they were found to be spotted with groups of minute black fruits (perithecia) of some parasitic fungus. A section through one of the groups shows that the proper tissue of the leaf is much disorganised, and is everywhere penetrated and destroyed by the brownish mycelium of a fungus connected with the perithecia. These perithecia are seated just below the epidermis, on both surfaces of the leaf, though they are found chiefly on the under surface. They are in some cases dead and their contents dispersed, in others there is a compact mass of colourless fungal tissue inside the dark outer skin ; this may be the dormant condition of the fungus. Sections through the leaf stalk show also a very luxuriant growth of the mycelium which is confined to the cortical tissue. It is very irregular in form and pushes its way between the cells. It does not extend beyond the petiole, stopping short at the point where the large cortical cells of the petiole are in contact with the small round compact cells of the twig into which the fungus does not penetrate.

The disease has been spreading rapidly in Kent during the last few years. The varieties of cherry trees that have been reported as specially liable are Waterloo, Bigarreau, Frogmore, Napoleon, Blackhearts, Clusters, and Eltons. Turks and Governor Woods have not as yet suffered much, and English and Flemish reds and May Dukes have not been attacked, though odd trees of other varieties, such as Bigarreau, growing among them have been diseased. In one orchard the disease attacked "Waterloo" first, soon spreading to other kinds, while at another place this variety had not been affected until last year, and then only the leaves had suffered, the fruit had not been damaged.

Fragment of Leaf of Cherry Tree showing groups of parasitic Fungi.

Professor Frank, of Berlin, has described, in *Gartenflora* 1887, pp. 2 and 51, a serious injury to cherry trees which, there is little doubt, is the same as the disease that has attacked the cherry orchards in Kent. The malady was first observed in the cherry orchards of the Altenland on the lower Elbe in Germany about the year 1880, and it soon spread widely. About the middle of June, yellow spots make their appearance on the leaves, and at the same time the young cherries

begin to fail. They are stunted in growth and the flesh of the fruit forms irregularly, or rottenness sets in so that the cherries are quite unsaleable.

Professor Frank found an abundant mycelium in the tissue of the leaf underneath the yellow spots, and also in the damaged cherries. During the summer small perithecia filled with long curved spores were developed on the yellow spots. The diseased leaves remain on the tree all winter, and are intermixed with the new foliage of the following season. In spring he found on the dead leaves a fungus fruit that had not been present on them in autumn, a perithecium round at the base, about one-twelfth of an inch in diameter, tapering up into a pointed beak that projects from the under surface of the leaf. These perithecia contain the spores that re-infect the young leaves and fruit. The fungus had already been described by Auerswald, under the name of *Gnomonia erythrostoma*.

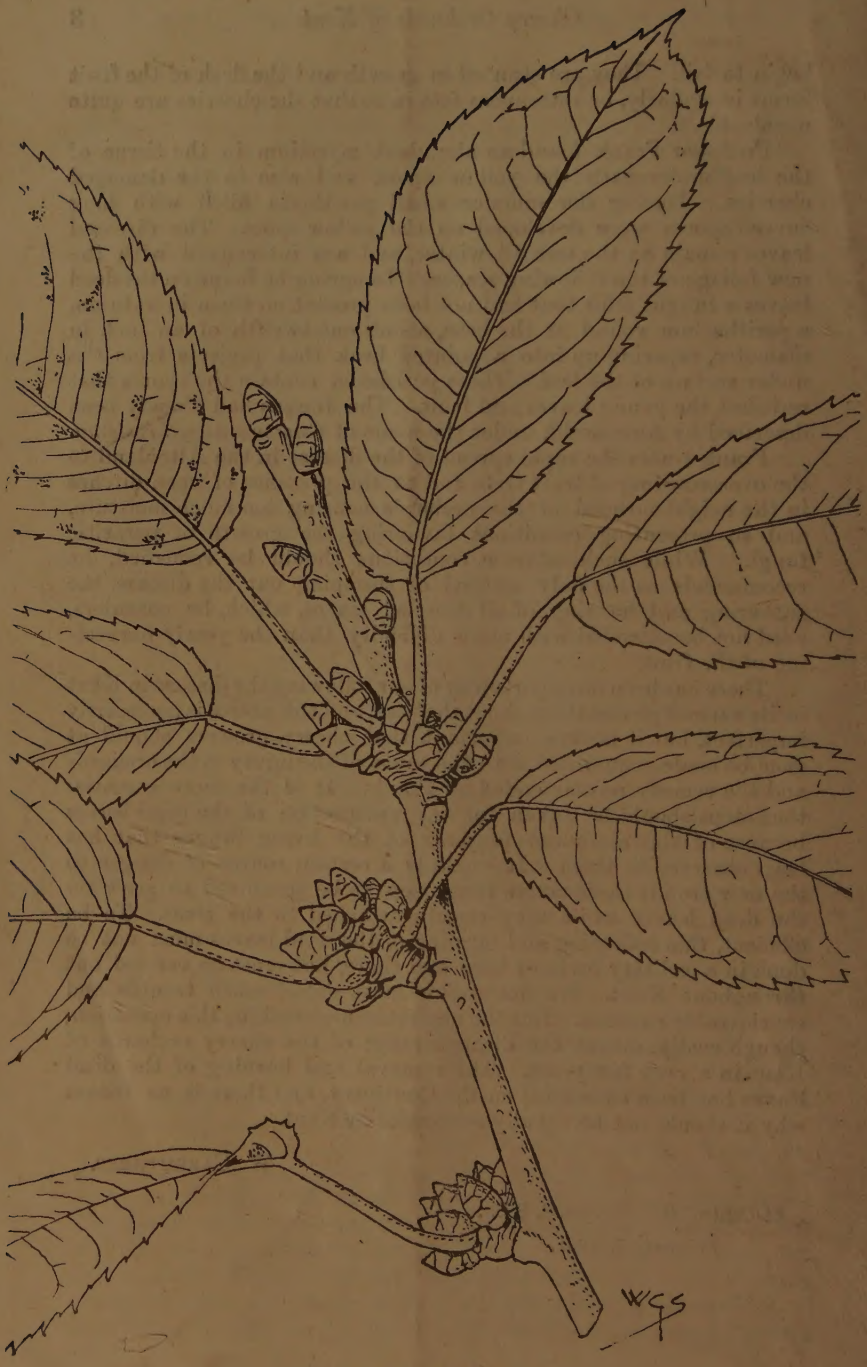
Frank traces the rapid spread of the disease in the Altenland to the overcrowding of fruit trees and to the presence of open ditches in the neighbourhood of the orchards causing too much moisture, and so presenting conditions favouring the growth of parasitic fungi. While such adverse conditions should be remedied, he recommends, as the only method of stamping out the disease, the gathering and burning of all diseased leaves, which, he considers, need not be attended with more difficulty than the yearly harvesting of the fruit.

There has been no opportunity of our following the disease in Kent in its various phases throughout the year, and this notice is necessarily imperfect, but it is very important that cherry growers should at once be made acquainted with the cause of the injury to the orchards and the remedy recommended by Frank. It is the more essential that steps should be taken for the destruction of the dead leaves because of the abundant presence of the living fungus that has been observed in them. It would be a certain source of danger to the new crop if these active fungi were to be permitted to grow on the dead leaves while they remain attached to the trees. To be efficient, this collecting and burning of the dead leaves must not be done in a solitary orchard here and there, but must be carried out throughout Kent. No doubt this must entail much trouble and considerable expense. But the neglect of undertaking this operation, though costly, means the disappearance of the cherry orchards of Kent in a very few years. The removal and burning of the dead leaves has been successful on the Continent, and there is no reason why it should not be equally successful in Kent.

W. Carruthers.

44 Central Hill, Norwood, S.E.:

February 5, 1901.



Twig of Diseased Cherry Tree.